



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,548	02/27/2006	Kenzo Machashi	12480000162US	7724
30/593 7590 11/23/2010 HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195				
EXAMINER				
WONG, EDNA				
ART UNIT		PAPER NUMBER		
1759				
MAIL DATE		DELIVERY MODE		
11/23/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

ADVISORY ACTION

Response to Amendment

This is in response to the Amendment After Final dated November 8, 2010. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Election/Restrictions

This application contains claims **7 and 8** drawn to an invention nonelected without traverse in the reply filed on May 7, 2009. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

Claims **1, 3-6, 11, 13-14 and 16-18** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Bokova et al.** ("Laser-Induced Effects in Raman Spectra of Single-Wall Carbon Nanotubes", Quantum Electronics (July 31, 2003), Vol. 33, No. 7, pp. 645-650) in view of **Irle et al.** ("Theoretical Study of Structure and Raman Spectra for Models of Carbon Nanotubes in Their Pristine and Oxidized Forms", *J. Phys. Chem. A* (2002), Vol. 106, pp. 11973-11980).

The rejection of claims 1, 3-6, 11, 13-14 and 16-18 under 35 U.S.C. 103(a) as

being unpatentable over Bokova et al. in view of Irle et al. is as applied in the Office Actions dated May 13, 2010 and September 8, 2010 and incorporated herein. The rejection has been maintained for the following reasons:

Applicants state that the "selectively oxidize and remove" language in Applicants' claim 1 actually defines the nature of the "irradiating" step. Thus, the Examiner has erred in not giving the "irradiating . . . so as to selectively oxidize and remove" limitation of Applicants' claim 1 patentable weight.

In response, the Examiner has given the claim limitation of "so as to selectively oxidize and remove a low-dimensional quantum structure of a density of states resonating with the wavelength of the electromagnetic wave" patentable weight.

The claim limitation of:

"so as to selectively oxidize and remove a low-dimensional quantum structure of a density of states resonating with the wavelength of the electromagnetic wave" ***is the result of doing*** the claimed method step of:

"irradiating the mixture of nano-scale low-dimensional quantum structures of differing densities of states with the electromagnetic wave in air for two hours after measuring the first Raman spectrum, the electromagnetic wave having an energy density of 10 kW/cm²."

The nature of the irradiating step is not deemed patentable.

In method claims, it is the overall method steps that are given patentable weight not the intended result thereof because the intended result does not materially alter the overall method. In method claims, the intended result is not given patentable weight when it simply expresses the intended result of a process step positively recited (MPEP § 2111.04).

The Applicants have a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) [MPEP § 2144].

Applicants state that the Examiner, if relying upon the theory of inherency, must provide a basis in fact and/or technical reasoning to reasonably support a determination that the allegedly inherent characteristic necessarily flows from the teachings of the prior art.

Applicants state that the nanotubes in Fig. 6 of Bokova have not been oxidized but, instead, have merely been reversibly changed in a resonance excitation state.

In response, there are three required conditions to achieve the result of the claimed irradiation: air, two hours and an electromagnetic wave having an energy density of 10 kW/cm².

Bokova teaches air (page 646, left column, lines 31-34) and an electromagnetic wave having an energy density of 10 kW/cm² (page 648, left column, lines 40-44).

Bokova doesn't teach the irradiation time, but that doesn't mean that a selective oxidation and removal of a low-dimensional quantum structure of a density of states

resonating with the wavelength of the electromagnetic wave isn't happening in his method because:

- (i) There is no requirement that Applicants' claims have to be expressly articulated in one or more of the references.
- (ii) There is no evidence that an irradiation for two hours would have produced new and unexpected results which are different in kind and not merely in degree from results of the prior art.

Bokova teaches the irreversible disappearance of the 'breathing' Raman modes of small-diameter nanotubes (0.8-1 nm) and the reversible appearance of additional 'breathing' modes from nanotubes with diameters of 0.1-0.3 nm smaller than the diameters of nanotubes undergoing resonance Raman excitation at room temperature (page 645, abstract). If there is irreversible disappearance (= removal) of the 'breathing' Raman modes of small-diameter nanotubes (0.8-1 nm), is this not caused by the oxidation of specific nanotubes?

Applicants state that it would not have been obvious to arrive at irradiating, for two hours, light having an energy density that does not cause a change in the physical property of the nanotube. As evidenced by Bokova, because the light in FIG. 6 is merely used for measuring a Raman spectrum, there is no credible reason for one ordinarily skilled in the art to just *arbitrarily* irradiate the light of Bokova for two hours, which greatly exceeds the time required for measuring a Raman spectrum (and, thus, would

be a waste of energy).

In response, Bokova teaches the same light having an energy density of 10 kW/cm² as presently claimed. Bokova teaches the appearance and disappearance of 'breathing' modes of nanotubes. The irradiation time of the electromagnetic wave having an energy density of 10 kW/cm² would have been a result-effective variable and one having ordinary skill in the art has the skill to calculate the irradiation time of the electromagnetic wave having an energy density of 10 kW/cm² that would have determined the success of the desired reaction to occur, i.e., the degree of the appearance and disappearance of 'breathing' modes of nanotubes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1759

EW
November 18, 2010